



Impact of AI and Digitalisation on Indigenous Communities

Introduction

What does it mean to talk about artificial intelligence (AI) in places where the internet still arrives by satellite—if at all? What does "digital inclusion" look like in communities whose knowledge systems predate the state? And how can we build an ethical digital future that doesn't simply include Indigenous people but is shaped by them?

These questions are not abstract for me. I was born to parents from rural Andean Peru, and though I grew up with access to education and digital tools, my earliest memories are of walking through highland paths, where life moved on a different pace. As a child, I didn't fully understand the richness or complexity of that world. Now, as someone working in research and data, I realize how little of that knowledge is reflected, or respected, by the systems we are building today.

In Latin America, "Indigenous" is not a monolith. It refers to over 800 groups with distinct

languages, traditions, and governance systems. From the Quechua and Aymara communities of the Andes to the Mapuche in Chile and the Maya in Guatemala, Indigenous peoples have developed and protected sophisticated ecological, agricultural, and social systems for centuries. And yet, they remain amongst the most digitally excluded populations in the region.

This report provides a snapshot of how AI and digital technologies are influencing rural and Indigenous communities in Latin America. It blends personal reflection with current research, country-level case studies, and data from UNESCO, the Inter-American Development Bank (IDB), OECD, and GSMA. It seeks to highlight both the risks and the transformative opportunities that AI and digitalization present—if approached through inclusive, ethical, and culturally grounded frameworks.

Why it Matters?

At first glance, the world's of artificial intelligence and Indigenous communities may seem far apart, one grounded in cutting-edge algorithms, the other in ancestral knowledge. Yet as digital technologies permeate all aspects of public life, their reach increasingly includes remote and historically marginalized areas.

During the 2025 World Bank Youth Summit (WBGYS), I was struck by how little attention is often paid to Indigenous voices in conversations about AI. I was surprised by how rarely Indigenous voices are represented in

conversations around digital governance. The decisions being made today about how AI is designed, trained, and deployed will profoundly shape Indigenous rights, cultures, and futures.

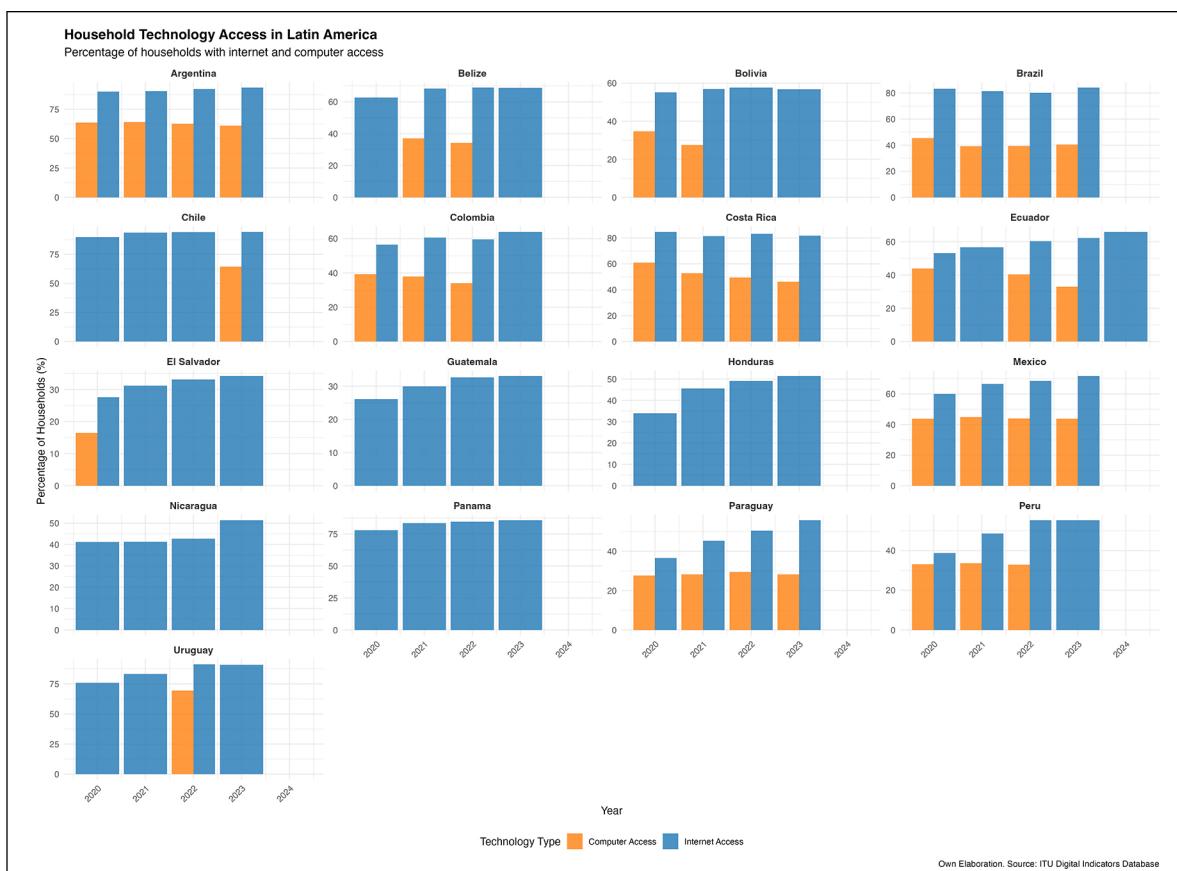
AI systems and algorithms increasingly mediate access to services, determine eligibility for aid, and even influence how public goods are distributed. In this context, it becomes crucial to assess how these tools are impacting Indigenous communities, not only as passive recipients but also as potential co-creators.

Where do we stand on Digital Inclusion?

Despite some regional progress, a persistent digital divide remains present across Latin America. According to UNESCO (2023), only about 40% of Indigenous individuals in the region possess basic computer skills, compared to over 70% in non-Indigenous populations. Even more concerning is the lack of disaggregated data, which makes it difficult to fully grasp the true scope of the gap.

A closer look at household technology access reveals wide disparities in digital infrastructure,

illustrated in the figure below, with significant implications for rural digitalization. Analysis of ITU data (2020–2024) shows that internet access consistently outpaces computer ownership across all countries. In regional leaders like Chile, Argentina, and Uruguay, internet penetration ranges from 80–85%, while computer access lags behind at 55–70%. In Guatemala, Honduras, and Nicaragua, countries with higher indigenous populations, figures drop to 30–50% for internet access and below 20% for computers.



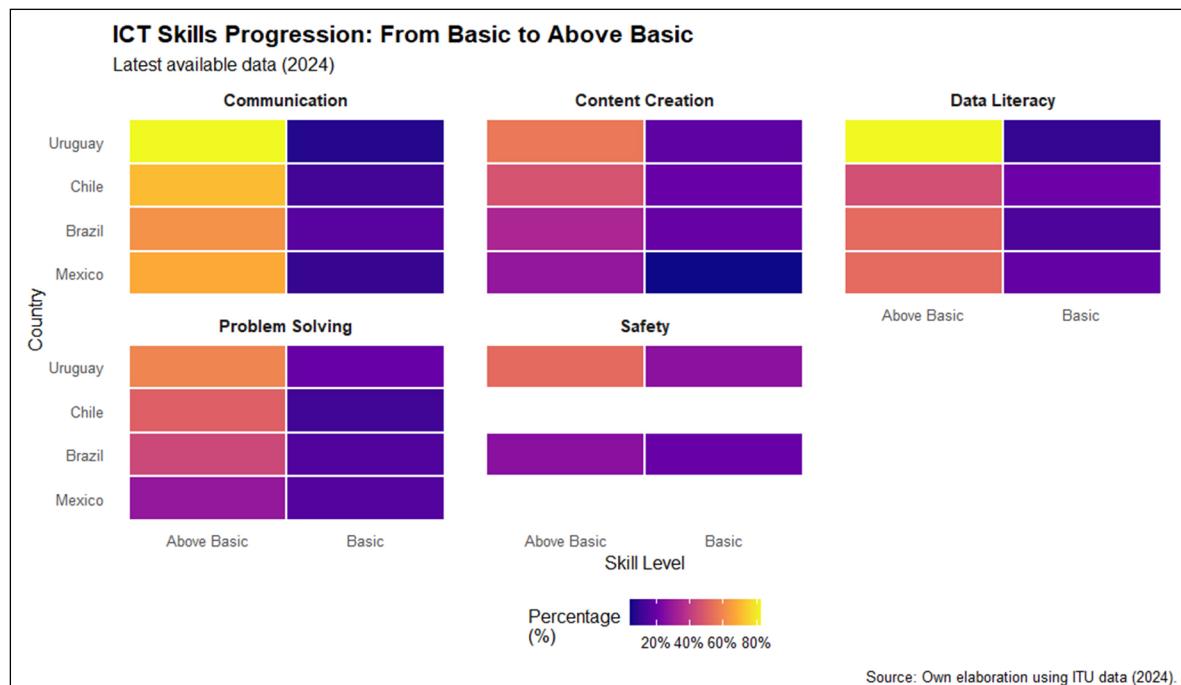
This reflects a **mobile-first reality** in much of the region, where smartphones are the primary, and often only, point of access, especially in rural areas. Countries like Panama and Costa Rica have rapidly expanded mobile internet coverage, jumping from around 60% to over 80% in just a few years, while others, such as El Salvador and Guatemala, have seen slower progress.

The persistent 20% – 25% point gap between internet and computer access underscores the need for mobile-friendly, cloud-based solutions.

Connectivity alone, however, is not enough. **Digital literacy** - covering skills such as communication, content creation, data literacy, problem solving and online safety remain

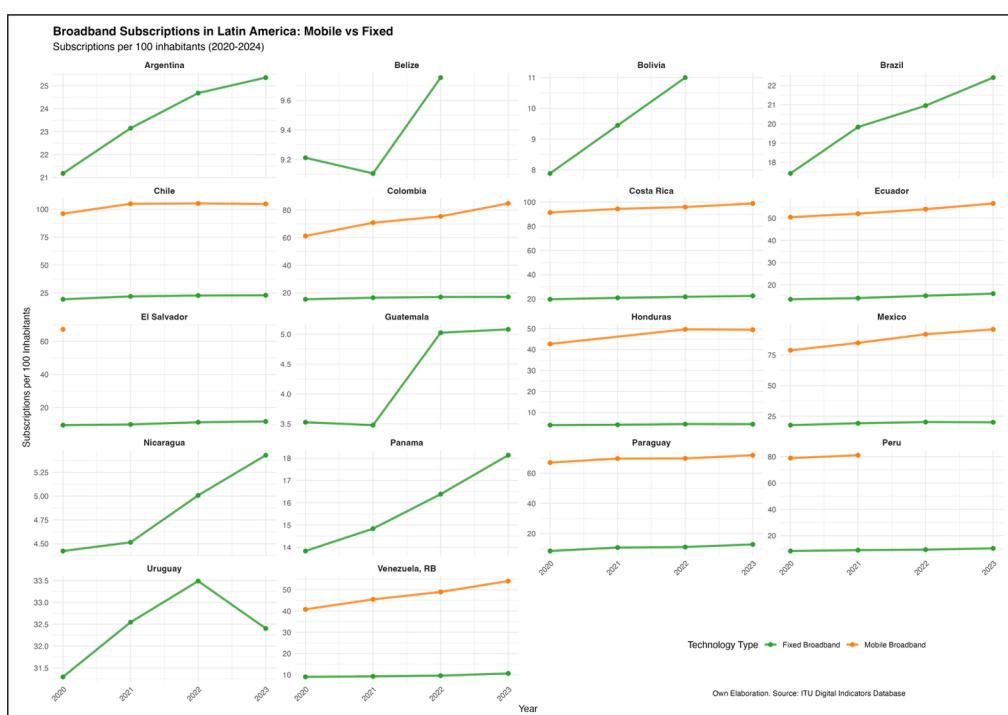
uneven. ITU data (2024) shows that while some reach “above basic” levels, many remain at basic proficiency, limiting their ability to participate in

the digital economy or use AI tools effectively. Even in more connected countries like Uruguay and Chile, advanced skills are far from universal.



Infrastructure limitations deepen this divide, as shown in the graph below. Fixed broadband access remains particularly low in rural and Indigenous territories. Across eight Latin American countries, rural internet penetration averages 62.3%, ranging from 49.0% in Peru to 76.3% in Costa Rica, compared to 81.9% in urban areas. The rural–urban gap is especially wide in Peru, Ecuador, and Colombia, where over 80% of

the region’s Indigenous population resides. The combined effect of low connectivity, limited device ownership, and gaps in digital literacy has far-reaching consequences, ranging from reduced visibility in digital spaces, exclusion from online public services, limited participation in innovation ecosystems and diminished influence over how AI tools affecting these communities are developed, governed, and deployed.



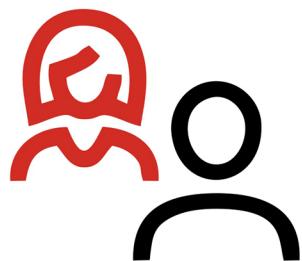
Understanding the barriers to digital inclusion

Population



Total population
in Latin America and the Caribbean 2024

623m



6.7%

42m

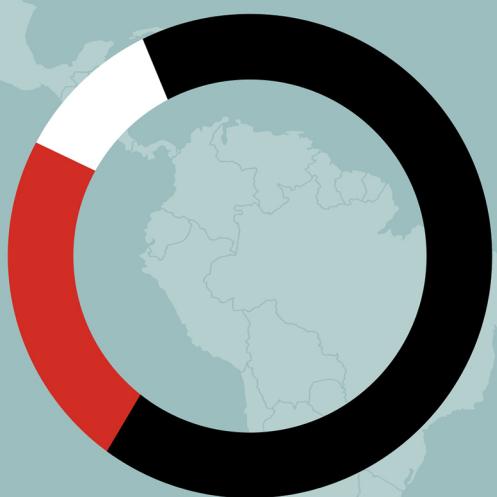
Indigenous - 80% in Mexico,
Guatemala, Peru and Bolivia

32%

+200m

Without broadband access

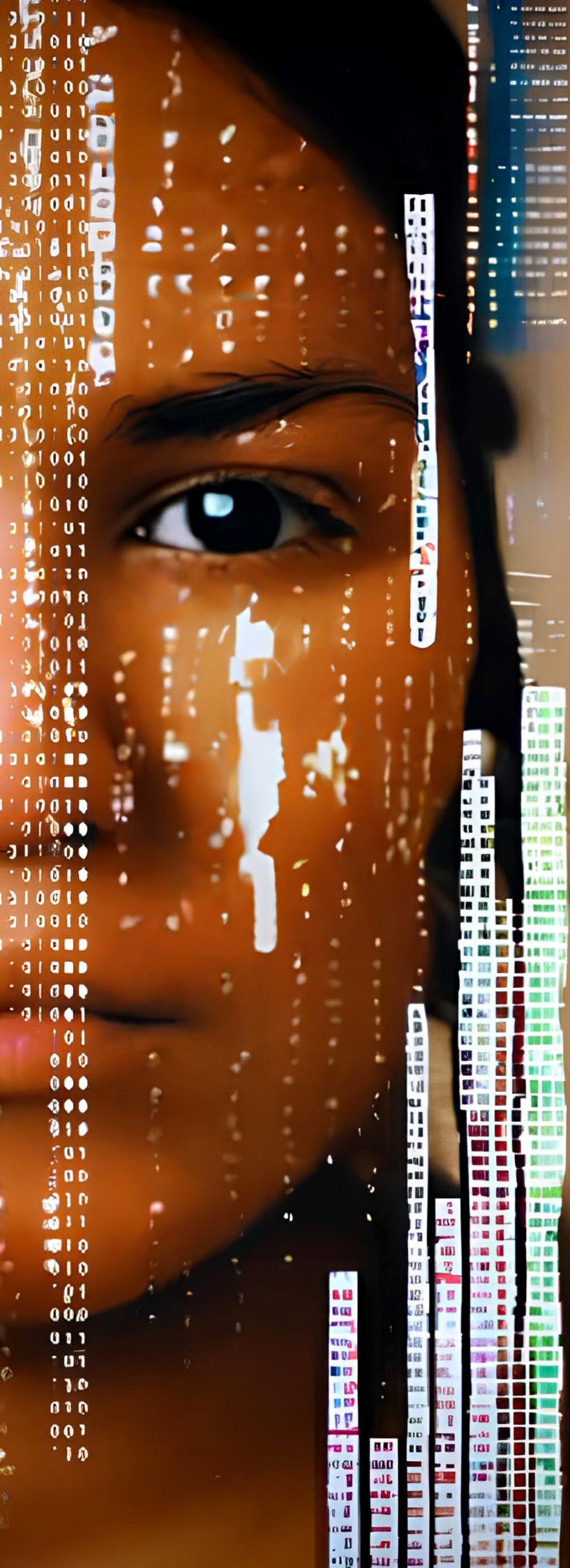
Access to internet
62% rural vs
82% urban areas



Sources: World Bank (2024), ITU(2024) , UNESCO 2023

Key livelihood sectors for Indigenous Peoples at risk from AI

Source: ILO (2021)

A close-up photograph of a woman's face, looking directly at the camera. Her eyes are dark and expressive. Overlaid on the image is a grid of binary code (0s and 1s) in various colors (blue, green, red, orange), creating a digital and futuristic feel.

Ai

Agriculture

55% Employment. Main source of livelihood; includes subsistence farming and traditional activities. Many in informal & precarious jobs.

Ai

Services

(Trade, Transport, Community)
27.1% Employment. Includes street vending, transport, textile, ancestral crafts, health, education & community.

Ai

Construction

9% Employment. Seasonal and casual labour, mostly informal

Ai

Manufacturing

7.9% Employment. Small-scale and cottage industries; often linked to artisan crafts.

Ai

Mining

(Quarrying, Utilities)

1.1% Employment. Smallest share; includes some extractive work in mining regions.

Challenges and Risks

1. Automation and Displacement

AI threatens to displace traditional labor. In the cultural sector, automation of artisan designs through generative models undermines the economic value of handwoven, symbolic crafts. For example, Indigenous textile designs from Mexico have been replicated without consent by major global brands like Shein and Ralph Lauren (Reuters, 2022).

These forms of appropriation not only strip communities of income but also devalue the labor and meaning behind their art. As younger generations face unstable incomes, many are abandoning traditional crafts, weakening cultural transmission.

According to the IDB (2020), the lack of legal and digital infrastructure to protect Indigenous IP leaves many communities vulnerable to appropriation and exploitation in the age of AI. A 2023 case study in Oaxaca, Mexico revealed that nearly 40% of local artisans reported their designs had been copied online.

2. Intellectual Property Theft

AI systems trained on public data may replicate Indigenous motifs, music, or medicinal knowledge without consent or attribution. This raises major concerns around Indigenous intellectual property (IP).

Mexico responded in 2021 with legislation criminalizing the unauthorized commercial use of Indigenous cultural expressions. However, enforcement remains difficult, especially given the communal nature of ownership and limited access to legal resources.

To address these issues, researchers in Mexico have built AI tools to catalogue textile patterns and identify plagiarized designs—an example of

how technology can be used to defend, rather than exploit, cultural heritage.

3. Algorithmic Bias and Marginalization

Most AI systems are trained on data that does not include Indigenous languages, expressions, or socio-cultural contexts. This exclusion results in tools that are ill-suited to Indigenous needs and can reproduce bias.

For example, translation engines may misinterpret native terms, while image recognition softwares may underperform in identifying rural environments. These issues are compounded by the lack of Indigenous youth in AI design and governance processes.

The concept of **Indigenous Data Sovereignty**, which affirms the right of Indigenous peoples to control data related to their knowledge and territories, is gaining traction globally as a framework to address these issues. The IDB and UNESCO now recommend this as a foundational principle for any AI deployment in Indigenous regions. These call for the **participatory inclusion of Indigenous communities at all stages of AI design**, to ensure technology is culturally respectful and does not misappropriate sacred knowledge.

Finally, Indigenous communities often face **technological marginalization** in the digital economy. A persistent digital divide means many Indigenous people lack reliable internet access or digital skills, especially in remote areas. In Latin America and the Caribbean, only about 40% of the Indigenous population has basic computer skills, limiting their ability to benefit from AI tools or to have their voices represented online (UNESCO, 2023). This gap in access and capacity can exacerbate inequities without deliberate inclusion.



Opportunities and Innovations

Despite the challenges, AI and digital technologies also hold promise when applied in inclusive and locally informed ways.

1. Climate Resilience and Environmental Monitoring

In the Amazon basin, Indigenous forest guardians are partnering with researchers to use satellite data and AI for early detection of wildfires, deforestation, and pollution.

These systems strengthen community-led conservation and global biodiversity. According to the IDB (2020), early AI-supported deforestation alerts in Colombia have led to a 23% faster response time by local Indigenous patrols.

Google's FloodHub, powered by machine learning, offers 7-day advance flood warnings in vulnerable regions critical for remote Indigenous communities with limited infrastructure (Lambert, 2024). Peru and Colombia are among the Latin American countries now covered.

2. Digital Health and Education Access

In Peru, a Quechua-speaking AI avatar has been developed to support language revitalization and improve access to e-learning platforms (Lopez et al., 2024). This is part of a broader push for Indigenous language AI models.

Predictive analytics also help public health authorities allocate vaccines and resources in underserved rural areas. In Ecuador, an AI triage tool piloted by the Ministry of Health has improved vaccination targeting by over 30% in rural zones with high Indigenous populations.

Similarly, AI-based agricultural tools support climate-smart farming for smallholder Indigenous farmers. Smart irrigation platforms using machine learning are being deployed in Bolivia and Paraguay to reduce water waste while preserving yield.

3. AI for Inclusion and Co-Design

IDB's fAIr LAC initiative and UNESCO guidelines emphasize that AI should be co-designed with Indigenous communities to ensure cultural relevance, transparency, and accountability. Programs that train Indigenous youth in coding, data science, and digital storytelling are crucial steps toward this goal.

For instance, the Innovation Lab in Mexico City has partnered with Tzeltal and Zapotec youth to build culturally specific digital libraries using natural language processing.

Path Forward: Policy and Design Principles

Given the transformative potential of AI, Latin American governments, NGOs, and tech companies must prioritize ethical and rights-based approaches when implementing digital solutions in Indigenous contexts. The following principles are critical:

- **Free, Prior, and Informed Consent (FPIC)**

Communities must be consulted meaningfully and have the option to decline participation in data or AI projects.

- **Cultural and Linguistic Relevance**

AI tools must respect local epistemologies and linguistic diversity.

- **Transparent Governance**

Include Indigenous representatives in algorithm design, data governance boards, and public consultations.

- **Capacity-Building and Access**

Support Indigenous-led tech education and provide devices, broadband, and localized platforms.

Conclusion

AI is not inherently extractive or emancipatory—it depends on how, and by whom, it is built. For Indigenous communities in Latin America, the digital transition presents both a threat and an opportunity. It risks deepening historical injustices, but it also opens doors to strengthen cultural autonomy, improve livelihoods, and protect ancestral lands.

To ensure the latter, digital inclusion must mean more than access. It must involve co-creation, consent, and recognition of Indigenous systems of knowledge and governance. The future of AI should not be about replacing tradition but **empowering it through technology**.





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Note - Some parts of this report were refined with the assistance of OpenAI's ChatGPT (personal communication, August 6, 2025) to improve clarity and cohesion.



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